

FOREST INSECT AND DISEASE CONTROL
STATE AND PRIVATE FORESTRY
REGION 4 - FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE
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1975

BIOLOGICAL EVALUATION
Mountain Pine Beetle Infestation
In The Island Park Campgrounds
1974

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INTRODUCTION

The mountain pine beetle has been epidemic on the Targhee National Forest and adjoining areas for over 15 years. Recently, losses have increased on the Island Park Ranger District causing great concern over mortality in the improved campgrounds. As a result of bark beetle-caused mortality in these campgrounds, a vigorous, hazard tree removal program was initiated.

Seven of the improved campgrounds on the District were surveyed to determine the level of bark beetle activity, the remaining green stand structure including reproduction, and the suitability for a preventive spray pilot test. Surveys are planned for 1975 to measure the infestation level in adjoining stands.

TECHNICAL INFORMATION

INSECT: Mountain pine beetle, Dendroctonus ponderosae Hopkins.

HOST TREE: Lodgepole pine, Pinus contorta Dougl.

TYPE OF DAMAGE: Killing of lodgepole pine in and adjacent to the improved campgrounds.

CAMPGROUNDS: See appended map (Figure 1).

<u>Name</u>	<u>Size (Acres)</u>	<u>Units (#)</u>	<u>Survey Plots (#)</u>
Upper Coffee Pot	7	14	14
Flat Rock	20	39	22
Buffalo	68	127	36
Big Spring	8	20	12
Box Canyon	5	19	10
Buttermilk	62	60	32
McCrea Bridge	10	25	12

EXTENT OF OUTBREAK: Throughout most of the lodgepole stands on the northern half of the Targhee National Forest.

LOCATION: Island Park Ranger District, Targhee National Forest, Idaho.

BIOLOGICAL INFORMATION

On-the-ground evaluation surveys were conducted in seven improved campgrounds located on the Island Park Ranger District. Variable and fixed radius type plots were placed along cruise lines selected using resource aerial photographs. At each sample point, trees over 4.5 inches d.b.h. were recorded on the variable plot (LOBAF), and host reproduction was recorded on a 1/300-acre fixed plot. On the variable plots, trees were tallied by one-inch diameter classes in one of the following categories: live (host and nonhost), new attacks (1974), standing dead (killed during 1973 or before), and stumps (cut and removed). Stump diameter was converted to d.b.h. to determine if the tree would have been in or out of the plot. On the fixed plots all lodgepole pine reproduction over three feet tall and under 4.5 inches d.b.h. was recorded. Plot data were analyzed by computer program and summarized below:

Campground	Trees Per Acre*					
	Host Live	1974 Attacks	Standing Dead	Stumps	Reproduction	Nonhost Live
Upper Coffee Pot	46.1	7.5	0.4	34.8	621	2.7
Flat Rock	190.0	14.2	4.4	16.7	327	-
Buffalo	128.9	10.1	5.9	30.3	275	1.9
Big Spring	311.2	15.4	4.3	40.8	25	-
Box Canyon	171.2	20.3	1.8	61.4	300	10.2
Buttermilk	112.5	6.5	-	19.9	562	-
McCrea Bridge	103.9	8.1	23.1	16.1	-	-

*These data are summarized by diameter in the Appendix.

Upper Coffee Pot, Box Canyon, and McCrea Bridge Campgrounds have lost more than 30 percent of the stand above 4.5 inches d.b.h. With most of the larger trees dead, mortality should decrease sharply in these campgrounds over the next few years. Buffalo and Buttermilk Campgrounds, after losing 26 and 19 percent respectively, have the greatest potential for continued mortality. The stands in Flat Rock and Big Spring Campgrounds consist of mostly small diameter trees. These stands will only have light mortality.

DISCUSSION

When concerned with stand units of campground size, the overall trend of an outbreak will generally dictate conditions within such areas. Although not practical, if the entire beetle population could be destroyed in a given area, it would only affect the immediate area and the beetle population of that generation. Complete brood mortality, by whatever means, may not cause a reduction in the number of new attacks. Operational control programs were only able to delay tree killing, and they did not significantly reduce the number of trees killed during an outbreak.

Campgrounds are constructed and maintained for the recreational use of the general public and, as such, a forested environment is usually preferred. A forested appearance is generally necessary to satisfy the visual pleasures of most forest visitors. As a result, post epidemic stand structure becomes very critical since little can be done to decrease the number of trees killed during an outbreak. The results of several post epidemic surveys in Region 4 recorded mortality between 9 and 38 percent of the stand 4 inches d.b.h. and above. The highest mortality recorded for any one year was 27 trees per acre.^{1/} When mortality within this range (9-38 percent) is not consistent with the objectives in a campground, a technique for protecting high-value trees is needed. Although several insecticides have been field tested and show good results, there is no pesticide registered as a preventive spray at this time.

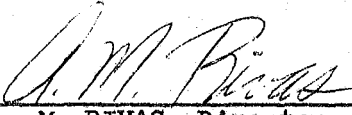
Based on the data presented, Buffalo and Buttermilk Campgrounds are suitable areas for a preventive spray test. Both have a sufficient number of large diameter green trees and an adequate number of currently infested trees to provide a large attacking beetle population.


RECOMMENDATIONS

Conduct a pilot test to evaluate the operational effectiveness of a preventive spray for the protection of lodgepole pine against bark beetle attack. Either Buffalo or Buttermilk Campground would be suitable for such a test.

Approved by:

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^{1/} Parker, D. L., 1973. Trend of a Mountain Pine Beetle Outbreak. J. Forest, 71(11):668-670.

A P P E N D I X

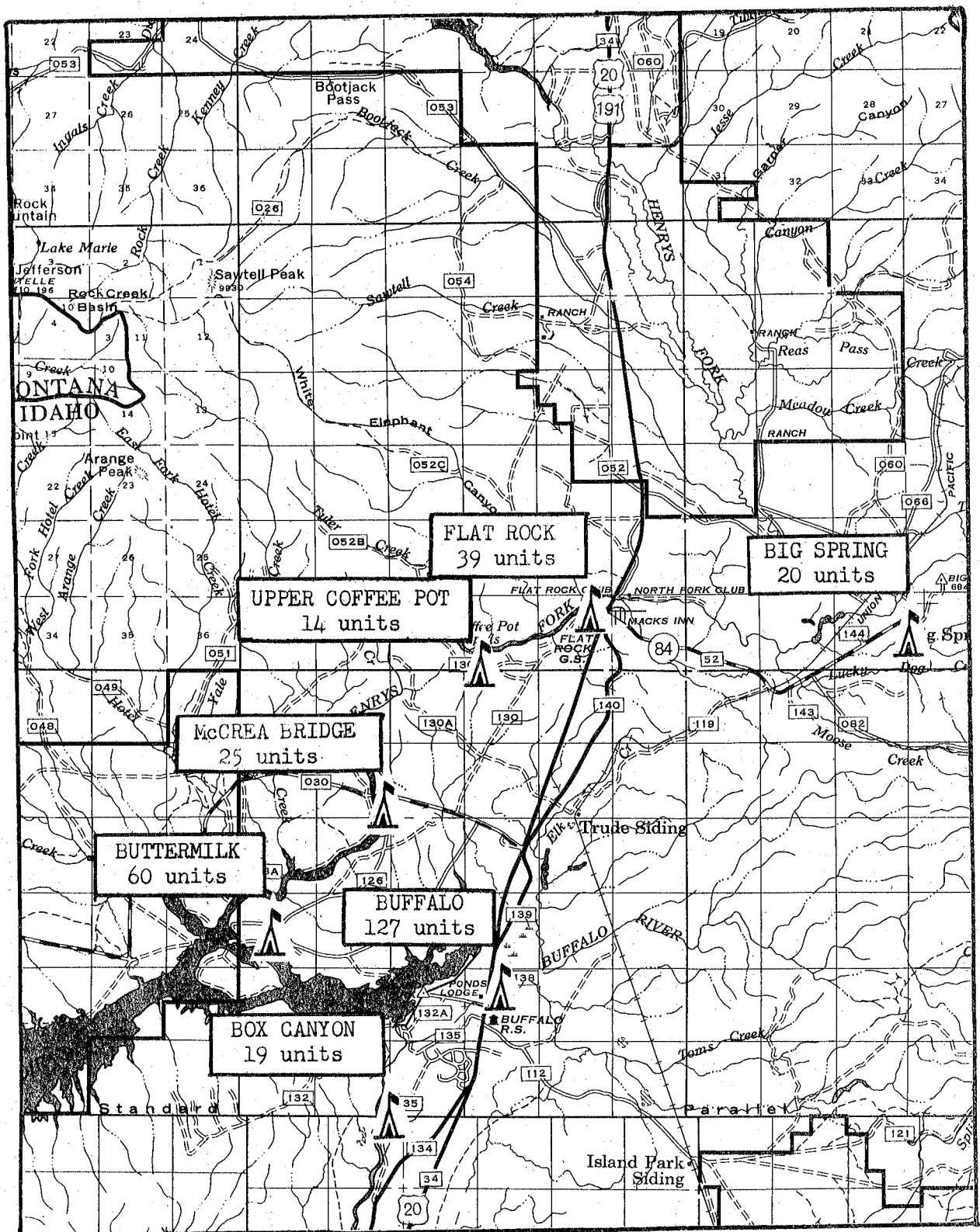


Figure 1. Location and number of units of improved campgrounds on the Island Park Ranger District, Targhee National Forest, Idaho.

DBH	Host Live	1974 Hits	Standing Dead	Stumps	Nonhost Live
5	5.2				
6	3.6				
7	-				2.7
8	4.1	2.0			
9	-	-		1.6	
10	3.9	-		11.8	
11	4.3	-		2.2	
12	7.2	0.9		2.7	
13	7.0	1.6		3.1	
14	4.0	-		3.3	
15	2.3	0.6		4.7	
16	1.0	1.5		1.0	
17	1.4	0.5		1.4	
18	1.2	0.4	0.4	1.2	
19	0.4	-		1.5	
20	-	-		0.3	
21	0.3	-		-	

Table 1. Stand structure by diameter class in trees per acre including the number of hazard trees removed (stumps) in Upper Coffee Pot Campground, Targhee National Forest, 1974.

DBH	Host Live	1974 Hits	Standing Dead	Stumps	Nonhost Live
5	53.3			3.3	
6	50.9			-	
7	40.8	6.8		-	
8	18.2	2.6		-	
9	9.3	1.0		-	
10	5.0	-		2.5	
11	2.8	2.1		2.8	
12	2.9	0.6	0.6	1.7	
13	1.5	0.5	-	2.0	
14	1.3	-	1.7	0.4	
15	1.1	-	-	0.7	
16	1.0	-	0.3	1.0	
17	0.6	0.6	0.6	-	
18	0.5		0.8	0.5	
19	0.5		0.2	0.9	
20	0.2		0.2	0.2	
21	0.2			0.2	
22	-			0.2	
23	-			-	
24	-			0.3	
Total	190.0	14.2	4.4	16.7	0

Table 2. Stand structure by diameter class in trees per acre including the number of hazard trees removed (stumps) in Flat Rock Campground, Targhee National Forest, 1974.

DBH	Host Live	1974 Hits	Standing Dead	Stumps	Nonhost Live
5	12.2				
6	9.9			7.1	
7	13.5			5.2	1.0
8	22.3	0.8		2.4	-
9	14.5	1.3		2.5	-
10	16.3	1.0	1.0	5.1	-
11	15.6	1.7	1.3	1.7	0.4
12	10.3	0.4	1.1	2.1	-
13	4.5	1.8	0.6	1.2	-
14	5.5	1.3	0.5	0.8	-
15	2.3	1.1	0.5	1.4	0.5
16	0.6	0.4	0.2	0.4	
17	0.7	-	0.8	0.2	
18	0.3	0.2	0.3	-	
19	0.3	-		0.1	
20	0.1	0.1	0.3	0.1	
21	0.1	-			
22	-	0.1			
Total	128.9	10.1	5.9	30.3	1.9

Table 3. Stand structure by diameter class in trees per acre including the number of hazard trees removed (stumps) in Buffalo Campground, Targhee National Forest, 1974.

DBH	Host Live	1974 Hits	Standing Dead	Stumps	Nonhost Live
5	55.0			6.1	
6	46.7			12.7	
7	53.0			-	
8	45.4	2.4	2.4	4.8	
9	28.3	3.8	1.9	7.5	
10	35.1	4.6		1.5	
11	24.0	-		2.5	
12	11.7	2.1		-	
13	6.3	1.8		1.8	
14	3.1	-		1.6	
15	2.0	0.7		1.4	
16	-			-	
17	0.5			-	
18	-			0.5	
19	-			0.4	
20	-			-	
Total	311.2	15.4	4.3	40.8	0

Table 4. Stand structure by diameter class in trees per acre including the number of hazard trees removed (stumps) in Big Spring Campground, Targhee National Forest, 1974.

DBH	Host Live	1974 Hits	Standing Dead	Stumps	Nonhost Live
6	5.1			5.1	10.2
7	26.2			7.5	
8	34.4			14.3	
9	27.2			4.5	
10	27.5	3.7	1.8	14.7	
11	16.7	-		4.5	
12	17.8	2.5		3.8	
13	13.0	5.4		-	
14	1.9	5.6		0.9	
15	0.8	1.6		3.3	
16	0.7	1.4		2.1	
17	-	-		0.6	
Total	171.2	20.3	1.8	61.4	10.2

Table 5. Stand structure by diameter class in trees per acre including the number of hazard trees removed (stumps) in Box Canyon Campground, Targhee National Forest, 1974.

DBH	Host Live	1974 Hits	Standing Dead	Stumps	Nonhost Live
5	11.5				
6	11.1				
7	14.0			2.3	
8	9.0			0.9	
9	9.2			0.7	
10	10.9			2.3	
11	11.8	0.5		2.4	
12	8.8	0.8		1.2	
13	9.8	0.7		2.0	
14	5.8	0.6		1.1	
15	3.1	1.0		1.5	
16	3.4	0.9		1.3	
17	1.4	0.2		1.4	
18	0.9	0.4		0.7	
19	0.5	0.6		1.0	
20	0.7	0.3		0.4	
21	0.4	0.3		0.1	
22	0.1	0.2		0.1	
23	0.1	0.1		-	
24	0.1			0.1	
25	-			0.1	
26	-			0.1	
29	-			0.1	
Total	112.5	6.5	0	19.9	0

Table 6. Stand structure by diameter class in trees per acre including the number of hazard trees removed (stumps) in Buttermilk Campground, Targhee National Forest, 1974.

DBH	Host Live	1974 Hits	Standing Dead	Stumps	Nonhost Live
5	6.1		6.1		
6	8.5		-		
7	18.7		-		
8	14.3		4.8		
9	11.3		-	1.9	
10	9.2		3.1	6.1	
11	13.9		3.8	1.3	
12	10.6	3.2	-	1.1	
13	1.8	0.9	0.9	0.9	
14	2.3	0.8	0.8	0.8	
15	2.0	0.7	1.4	1.4	
16	3.0	1.8	0.6	-	
17	1.1	-	0.5	1.1	
18	0.5	-	-	0.8	
19	0.4	-	0.8	0.4	
20	-	0.8	-	0.8	
21	-		-		
22	-		0.3		
27	0.2				
Total	103.9	8.1	23.1	16.1	0

Table 7. Stand structure by diameter class in trees per acre including the number of hazard trees removed (stumps) in McCrea Bridge Campground, Targhee National Forest, 1974.